

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

PCT

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

To:

**SEMICONDUCTOR ENERGY
LABORATORY CO., LTD.
398, Hase, Atsugi-shi,
Kanagawa 2430036
Japan**

Date of mailing
(day/month/year)

19.4.2005

Applicant's or agent's file reference

PCT7695-7696

FOR FURTHER ACTION

See paragraph 2 below

International application No.

PCT/JP2005/001280

International filing date (day/month/year)

24.01.2005

Priority date (day/month/year)

26.01.2004

International Patent Classification (IPC) or both national classification and IPC

Int.Cl. **H01L29/786**

Applicant

SEMICONDUCTOR ENERGY LABORATORY CO., LTD.

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☒ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☒ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Date of completion of this opinion

30.03.2005

Name and mailing address of the ISA/JP

Japan Patent Office

3-4-3, Kasumigaseki, Chiyoda-ku, Tokyo 100-8915, Japan

Authorized officer

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WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/JP2005/001280

Box No. I

Basis of the opinion

1. With regard to the language, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ This opinion has been established on the basis of a translation from the original language into the following language _____, which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).

2. With regard to any nucleotide and/or amino acid sequence disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:

a. type of material

- ☐ a sequence listing
☐ table(s) related to the sequence listing

b. format of material

- ☐ in written format
☐ in computer readable form

c. time of filing/furnishing

- ☐ contained in the international application as filed.
☐ filed together with the international application in computer readable form.
☐ furnished subsequently to this Authority for the purposes of search.

3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

4. Additional comments:

WRITTEN OPINION OF THE
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Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non obvious), or to be industrially applicable have not been examined in respect of:

☐ the entire international application

☒ claims Nos. 27

because:

☐ the said international application, or the said claims Nos. _____
relate to the following subject matter which does not require an international preliminary examination (*specify*):

☐ the description, claims or drawings (indicate particular elements below) or said claims Nos. _____
are so unclear that no meaningful opinion could be formed (*specify*):

☐ the claims, or said claims Nos. _____ are so inadequately supported
by the description that no meaningful opinion could be formed.

☒ no international search report has been established for said claims Nos. 27

☐ the nucleotide and/or amino acid sequence listing does not comply with the standard provided for in Annex C of the
Administrative Instructions in that:

the written form ☐ has not been furnished
☐ does not comply with the standard

the computer readable form ☐ has not been furnished
☐ does not comply with the standard

☐ the tables related to the nucleotide and/or amino acid sequence listing do not comply with the technical requirements
provided for in Annex C-bis of the Administrative Instructions in that the computer readable form:

☐ has not been furnished
☐ does not comply with the technical requirements

☐ See Supplemental Box for further details.

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/JP 2005/001280

Box No. IV Lack of unity of invention

1. ☒ In response to the invitation (Form PCT/ISA/206) to pay additional fees the applicant has:

- ☒ paid additional fees
☐ paid additional fees under protest
☐ not paid additional fees

2. ☐ This Authority found that the requirement of unity of invention is not complied with and chose not to invite the applicant to pay additional fees.

3. This Authority considers that the requirement of unity of invention in accordance with Rule 13.1, 13.2 and 13.3 is

- ☐ complied with
☒ not complied with for the following reasons:

The "special technical feature" of claims 1-26 relates to "forming a first film pattern by a droplet discharge method; forming a photosensitive material over the first film pattern; forming a mask pattern by irradiating a region where the first film pattern and the photosensitive material are overlapped with a laser beam by developing; and forming a second film pattern having a desired shape by etching the first film pattern using the mask pattern as a mask", while the "special technical feature" of claims 28-31 relates to "a wiring formed by a droplet discharge method and a gate electrode which has a width of 5 micro meters or less". There is no technical relationship among those inventions involving one or more of the same or corresponding technical features. Therefore, these groups of inventions are not so linked as to form a single general inventive concept.

4. Consequently, this opinion has been established in respect of the following parts of the international application:

- ☐ all parts.
☒ the parts relating to claims Nos. 1-26, 28-31

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.

PCT/JP2005/001280

Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

| | | | |
|-------------------------------|--------|--------------------------------|-----|
| Novelty (N) | Claims | <u>1-26</u> | YES |
| | Claims | <u>28-31</u> | NO |
| Inventive step (IS) | Claims | <u>1-14, 16, 21</u> | YES |
| | Claims | <u>15, 17-20, 22-26, 28-31</u> | NO |
| Industrial applicability (IA) | Claims | <u>1-26, 28-31</u> | YES |
| | Claims | | NO |

2. Citations and explanations

D1:JP 2002-313226 A(FUJITSU LIMITED), 2002.10.25, [0021], Fig. 2, (Family:none)
D2:JP 11-254237 A(SEIKO EPSON CORPORATION), 1999.09.21, [0020]-[0025], (Family:none)
D3:JP 2003-258265 A(NATIONAL INSTITUTE OF ADVANCED INDUSTRIAL SCIENCE AND TECHNOLOGY), 2003.09.12, [0032]-[0035], (Family:none)
D4:JP 2001-179167 A(NEC CORPORATION), 2001.07.03, [0010]-[0018], (Family:none)

Claims 1-14

The subject matters of claim 1-14 are considered to involve an inventive step over the document cited in the international search report.

D1, D2, D3 and D4 do not disclose a method for manufacturing a thin film transistor comprising the steps of: forming a semiconductor film by a droplet discharge method, forming a photosensitive material over the semiconductor film, forming a second mask pattern by irradiating the photosensitive material with a laser beam and by developing, forming a semiconductor region having a desired shape by etching the semiconductor film using the second mask pattern as a mask. And the subject matters claimed appear to be non-obvious.

Claims 15, 17-20, 22-26

The subject matter of claim 15, 17-20, 22-26 does not appear to involve an inventive step in view of the D1 and D2 cited in the ISR.

D1 discloses a method for manufacturing a semiconductor device, comprising the steps of: forming a semiconductor film, forming a photosensitive material over the semiconductor film, forming a second mask pattern by irradiating the photosensitive material with a beam and by developing, forming a semiconductor region having a desired shape by etching the semiconductor film using the second mask pattern as a mask. And D2 discloses a step of forming a first pattern by a droplet discharge method. The method for manufacturing a pattern in D1 and D2 are concerned with mutually related technical fields. Therefore, the skilled person in the art would easily conceive the idea of applying the technical feature employed in D2 to the invention disclosed in D1.

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.

Continuation of: V. 2

Claim 16

The subject matter of claim 16 is considered to involve an inventive step over the document cited in the international search report.

D1, D2, D3 and D4 do not disclose a step forming a third film pattern to be connected to the second film pattern by a droplet discharge method. And the subject matter claimed appears to be non-obvious.

Claim 21

The subject matter of claim 21 is considered to involve an inventive step over the document cited in the international search report.

D1, D2, D3 and D4 do not disclose that the third film pattern is a wiring. And the subject matter claimed appears to be non-obvious.

Claims 28-31

The subject matters of claim 28-31 do not meet the requirement of novelty.

D3 discloses a gate electrode which has a width of 5 micron or less and gate wiring is formed by a droplet discharge method.